Pre-Class Discovery Handout: Financial Markets & Trading Infrastructure

Activity 1: Build an Order Book

Scenario: The following limit orders are resting in an exchange's order book for stock XYZ.

Buy (Bid) Side			Sell (Ask) Side		
ID	Price	Shares	ID	Price	Shares
B1	CHF 49.50	100	S1	CHF 50.00	80
B2	CHF 49.00	200	S2	CHF 50.50	120
B3	CHF 48.50	150	S3	CHF 51.00	100
B4	CHF 48.00	50	S4	CHF 51.50	200

Q1: A market buy order for 150 shares arrives. Which sell orders execute and at what prices?

Q2: Calculate the volume-weighted average execution price (VWAP).

Q3: What is the bid-ask spread before and after the market order?

Activity 2: Settlement Risk

Scenario: You sell 100 shares of Nestlé on the SIX Swiss Exchange on Monday (trade date T).

Q1: Under $T+2$ settlement, when do you receive payment?

Q2: What risks exist between trade date and settlement date? Name at least two.

Q3: How does a Central Counterparty (CCP) reduce these risks?

Activity 3: The Hidden Cost of "Free"

Scenario: A commission-free broker uses Payment for Order Flow (PFOF). You place a market order to buy 100 shares at approximately CHF 50 per share.

Q1: If the broker routes your order to a market maker who fills you at CHF 0.02/share worse than the best available price, what is your hidden cost?

Q2: A traditional broker charges a flat fee of CHF 9.90 per trade. Which broker is cheaper for this 100-share order?

Q3: At what order size (in shares) does the commission-free broker become *more* expensive than the flat-fee broker?

Solutions

Activity 1: Build an Order Book

A1: The market buy order sweeps the ask side at the best available prices. First, S1 fills entirely: 80 shares at CHF 50.00. Then S2 partially fills: 70 shares at CHF 50.50 (only 70 of 120 needed to reach 150 total). S3 and S4 are untouched.

A2: VWAP $= \frac{80\times50.00+70\times50.50}{150} = \frac{4{,}000+3{,}535}{150} = \frac{7{,}535}{150} \approx$ CHF 50.23.

A3: Before: best bid = 49.50, best ask = 50.00, spread = CHF 0.50. After: best bid = 49.50 (unchanged), best ask = 50.50 (S1 fully consumed, S2 has 50 shares remaining at 50.50), spread = CHF 1.00. The spread doubled because the aggressive buy order consumed the cheapest liquidity.

Activity 2: Settlement Risk

A1: Under $T+2$, settlement occurs two business days after the trade. A Monday trade settles on Wednesday. You receive cash and the buyer receives shares on Wednesday.

A2: (1) Counterparty (credit) risk: the buyer may default before settlement, leaving you without payment and without your shares. (2) Market risk: the share price may move adversely between T and $T+2$, so a replacement trade would be at a worse price. Other valid answers include liquidity risk and operational/system failure risk.

A3: A CCP interposes itself between buyer and seller, becoming the buyer to every seller and the seller to every buyer. This eliminates bilateral counterparty risk. The CCP manages exposure through margin requirements, default funds, and daily mark-to-market, ensuring that even if one party defaults, the other side is made whole.

Activity 3: The Hidden Cost of "Free"

A1: Hidden cost $= 100 \times$ CHF 0.02 = CHF 2.00. You pay no explicit commission but receive a price that is CHF 2.00 worse than the national best bid/offer.

A2: The commission-free broker costs CHF 2.00 in price improvement lost; the traditional broker costs CHF 9.90. For this 100-share order, the commission-free broker is cheaper by CHF 7.90.

A3: Breakeven: $0.02 \times n = 9.90$, so $n = 9.90/0.02 = 495$ shares. At 495 shares the costs are equal. For orders larger than 495 shares, the commission-free broker's hidden PFOF cost exceeds the flat fee.

